ASSESSMENT OF THE USE OF INFORMATION COMMUNICATION TECHNOLOGIES (ICT) ON THE ECONOMIC PERFORMANCE OF AGRO-BASED FOOD INDUSTRIES IN SOUTH-WEST NIGERIA

I. A. Ayinde; M. U. Agbonlahor; T. E. Mafimisebi and O. A. Adebayo

Paper prepared for presentation at the Farm Management Association of Nigera Conference, Abuja, Nigeria
Oct. 19-21, 2004

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I. A. Ayinde; M. U. Agbonlahor; T. E. Mafimisebi and O. A. Adebayo
Department of Agricultural Economics and Farm Management, University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria

ABSTRACT
The use of Information Communication technologies (ICTs) as a management tool has gained widespread significance in recent years and the stock of management advantages provided by ICT cuts across disciplines and sectors. Management experts see this globalization of management options as the "super production and marketing input" needed by firms to boost their competitive edge. This paper assesses the adoption and use of ICTs on the economic performance of Agro-industries (ABFIs) in South-West, Nigeria. Primary data were collected from a total of 80 respondents from the study area. Budgetary analysis, t-test of mean differences and multiple regressions were used in the data analysis to actualise the study objectives. In assessing the effect of ICTs on the economic performance of the companies, the "before and after" scenarios were analysed. The results revealed an increase of about 14 percent increase in total profit after adoption of ICTs. The reduction in marketing cost brought about by adopting ICT s were found to be largely responsible for the increase in profit of the ICT adopting firms. The results also revealed that irrespective of the scale of operation, there was a general reduction in total marketing cost due to ICT adoption. The Cobb Douglas function fitted to explain the cost effect relationship between yearly firms' expenditure on ICTs and firm's characteristics revealed that the proportion of ICT literate staff to the total staff strength and age of firm were found to be significant positive determinants of ICTs expenditure. The study recommends the adoption and use of ICTs by agro-based firms as a cutting edge input that is not only cost effective but more efficient in the long run.

INTRODUCTION

Information communication technologies (ICTs) are globalised, cutting edge, capital inputs that find relevance in any production and or marketing management process, where automation, high speed, information delivery and retrieval systems as well as ease of accessibility by all is promoted. The all-purpose "bridge" that ICT presents provides sustainable solutions to almost all facets of human endeavour. More often, the globalisation doctrine is seen as the ICTs involvement in the decision making function of management firms. In Nigeria, the use of ICTs has assumed increasing significance, but the operational effectiveness of the application has been far below expectation, if not disappointing (Akinyosoye, 2001). The high level of poverty and lack of basic infrastructure in the country have led to the absence of "buyer power" in the potential ICT set up. These application failures can also be traced to two identifiable levels. First, the policy level wherein the introduction of ICTs has not been in coordination with other efforts such as the development of adequate supporting infrastructure, education and training of users. Second, the organizational level of computerization has taken place without an adequate understanding of the organizational culture and context (Soyibo et al, 2002). This also implies that catching up from a position of inadequate infrastructure and lack of organizational culture poses enormous investment challenges. This is especially so when the literacy levels of the population is extremely low with many people living outside the money economy. These indications illustrate that Nigerians

need "access" to many infrastructure in order to effectively use ICTs for development. The basic question to ask is whether the country has the potential to tap the economies of scale of Information technology (Soyibo et al, 2002). This question could be answered if relative emphasis could be given to the use of ICT to modernize economic processes in public and private sector management decision-making.

This can be through the adoption of e-business and e-commerce, which are components of ICT. E-commerce involves exchanges among customers, business partners and the vendor through the electronic medium. While e-business is composed of these same elements, it also includes operations that are handled within the business itself. (Deitel et al, 2001). E-business and e-commerce have increased the speed and ease of business transactions and as a result, competition is intense worldwide. Businesses therefore are trying to adjust constantly to new technologies, integrate newer and faster systems and meet the needs of people around the world. Inventories are no longer kept in preparation for orders; rather, products are prepared specifically for consumers (Deitel et al, 2001). With e-business and e-commerce, people can pay their bills, write and cash cheques, trade stocks, take out loans, mortgage their homes and manage their assets online. Money may be replaced by more convenient technologies such as smart cards and digital cash. Intelligent programmes will take care of the financial and logistical aspect of the interactions between individuals and corporations that populate the Internet. All that a person will need to go shopping is a connection, a computer and a digital form of payment. An increasing amount of consumer information is being made available, leading to better awareness of products and services for customers.

PROBLEM STATEMENT:
Information Communication Technologies such as Internet have the potential to improve the economic performance of agricultural and food marketing systems by affecting almost every structural characteristics of these markets. The Internet is already the most valuable source of information for farmers and agribusinesses with Internet access. Now, with the adoption of this new technological dynamo, its usage is expected to have gained prominence by virtually all sectors including the ABFIs in Nigeria. It is thus important to find out their patronage level of ICT, whether its use is profitable; the socio-economic factors affecting ICT usage, the effects of ICT usage on the business of ABFIs as well as the problems encountered by them from its usage.
Objectives of the Study:
The main objective of the study is to carry out an assessment of the use of Information Communication Technologies on the economic performance of Agro-Based Food Industries (ABFIs) in South-West, Nigeria.

The specific objectives are to:

i. determine the costs and returns to ICT usage by ABFIs in the study area ;
ii. determine the socio-economic factors affecting use of ICT usage by ABFIs;
iii. find out the problems encountered by ABFIs in the use of ICT.
vi. proffer recommendations on ways by which ICT can be adequately used by ABFIs.

METHODOLOGY AND ANALYTICAL PROCEDURES:

The study was carried out in three of the six states in South-Western Zone of Nigeria. The three states are Ogun, Lagos and Oyo States. Ogun State covers an area of 16,762km^2. The density per km^2 is 139. Its population is 2,333,726 (1991 census). Agriculture remains the mainstay of the economy of the State. The major occupations of the inhabitants are farming and trading. Lagos State covers an area of 3,577km^2. The density per km^2 is 1712. Its population is 5,725,116 (1991 census). It had experienced phenomenal growth and transformation to become one of Africa's largest and most important commercial and industrial cities. Oyo State covers an area of 27,460km^2. Its population is 3,452,720 (1991 census). The density per km of Oyo State is 126. Farming is the most important traditional occupation of the people. About 75 percent of the working population is engaged in agriculture. The State is endowed with many small and large-scale industries, and ranks as the third most industrialized state in the country.

Cross-sectional primary data were collected using the survey method. Interviews were conducted using the questionnaire. E-mails and the telephone were used to book for appointment ahead, in order to reduce the problem of repeated visits. Secondary sources of data include textbooks, magazines, journals, reports, conference papers, e-books among others. The lists of the ABFIs were obtained from Ibadan, Abeokuta and Lagos Chambers of Commerce, Industry, Agriculture and Mines for Oyo, Ogun and Lagos States respectively.

Simple Random Sampling technique was used in selecting 80 ABFIs from the list of 160 ABFIs (serving as the sample frame). Only 66 questionnaires, which constituted about 42% of the sample frame, were used in the subsequent analysis. Data collected were analysed using analysis of costs and returns, difference of two means, and regression analysis.

Analysis of cost and return: This was used to assess the profitability of the respondents ABFIs in the study area. The calculation was based on Naira per year. It is given as:

$$\pi = TR - TC \qquad (\ldots\text{equation 1})$$

Where

π = Profit (₦/Yr)

TR = Total Revenue (₦/Yr)

TC = Total Cost of Marketing (₦/Yr)

This was used to determine the profitability of operation of ABFIs before and after the adoption and use of ICT.

Difference of two means: Difference of two means was used to

a. Compare the total cost of marketing before and after ICT establishment (₦/Yr)….. (denoted as Pair 1)
b. Compare the mean revenue before and after ICT establishment (₦/Yr) …(denoted as Pair 2)

It is stated as follows:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2 + S_2^2}{n_1 \quad n_2}}} \quad (\ldots \text{equation 2})$$

For pair 1 (Cost of marketing)

Where X_1 = Total Cost of Marketing before ICT (TCMBICT) (₦/Yr)

X_2 = Total Cost of Marketing after ICT (TCMAICT) (₦ /Yr)

S^2_1 = Standard Deviation for (TCMBICT)

S^2_2 = Standard Deviation for (TCMAICT)

n_1 = Number of ABFIs in group one.

n_2 = Number of ABFIs in group two.

For pair 2 (revenue)

Where X_1 = Mean Revenue before ICT establishment (MRBICTE) (₦/Yr)

X_2 = Mean Revenue after ICT establishment (MRAICTE) (₦/Yr)

S^2_1 = Standard Deviation for (MRBICTE)

S^2_2 = Standard Deviation for (MRAICTE)

n_1 = Number of ABFIs in group one.

n_2 = Number of ABFIs in group two.

This analysis was carried out under the hypothesis that:

(a) For pair 1:

Ho: TCMBICT = TCMAICT

Ha: TCMBICT ≠ TCMAICT

(b) For pair 2:

Ho: MRBICTE = MRAICTE

Ha: MRBICTE ≠ MRAICTE

Regression Analysis: A multiple regression model was specified to determine the factors that affect the use of ICT by the ABFIs in South-West Nigeria. The forms of the model considered were the linear, semi-log, Cobb-Douglas and the exponential functions.

The linear regression equation is represented in the explicit form thus:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e$$

Where

Y = ICT usage (Amount expended on ICT (₦ /Yr)

X_1 = Year of establishment of agro-based food business (Yr)

X_2 = Status of business (Public = 0: Private = 1)

X_3 = Staff strength {ICT trained staff vis-à-vis non-trained staff (%)}

X_4 = Patronage level of customers through ICT (%)

X_5 = Amount spent on other forms of advertisement (₦/Yr)

a = constant

e = error term or stochastic disturbance

RESULTS AND DISCUSSION:

The analysis in Table 1 revealed that the profit of the ABFIs before and after ICT adoption was ₦27.61million and ₦1.9billion per year respectively. This implies that ICT had contributed so much to the profitability of the ABFIs businesses, as attested to by the respondents themselves. This was in the area of improved market performance, which largely stems from reductions in transactions cost for buyers and sellers and improvement in market liquidity and efficiency.

Furthermore, the difference of mean test (Table 2) shows that the total cost of marketing (₦/Yr) before (₦ 434.63million) and after ICT adoption (₦ 2.77 billion) were significantly different ($\alpha_{0.01}$) and this implies that the total cost of marketing after ICT adoption was more than before ICT adoption. This is largely as a result of the procurement of computers, ICT devices and soft wares for commerce as well as expenditure from payment of salaries of additional ICT staff. In the same vein, the mean revenue before (₦ 1.72 billion) and after ICT adoption (₦3.62 billion) were significantly different ($\alpha_{0.01}$), indicating that revenue accruable from the use of ICT by ABFIs tend to be more than when it was not adopted. This was as a result of reductions in transactions cost for buyers and sellers and improvement in market liquidity and efficiency, while barriers to gain access to their products were reduced.

The Cobb-Douglas equation was chosen to explain the regression results of the factors affecting ICT usage by respondents based on its highest value for the R^2, adjusted R^2, F-value and its conformity with the a priori signs and magnitude of the parameter estimates. The regression results are presented below:

$Y = 3.485^{***} + 0.181X_1^{**} + 0.146X_2 + 0.333X_3^{***} - 0.137X_4 + 0.239X_5^{**}$
(4.556) (2.159) (0.877) (5.287) (-0.816) (2.531)

R^2 = 0.633; Adjusted R^2 = 0.602; F value = 20.671

Note: *** = ($\alpha_{0.01}$) ** = ($\alpha_{0.05}$)

Source: Field Survey, 2004

Generally, the results showed that there was a significant relationship between ICT usage and year of establishment (X_1), ICT staff strength (X_3) of the firm and the amount spent

on other forms of advertisement (X_5). Usage of ICT increases with increase in the year of establishment of ABFIs. This implies that ceteris paribus, usage of ICT would increase over time as other existing ABFIs gain more marketing experience. ABFIs staff strength exercised the greatest impact on the prediction of the dependent variable by the independent variable with a beta value of 0.333. Hence, high level of ICT trained staff would enhance the usage of ICT. This follows priority expectations because ICT staff strength of the ABFIs is expected to offer adequate firm efficiency in the use of electronic inventory and order systems. Furthermore, the amount spent on other forms of advertisement is statistically significant. This implies that cost of advertisement increases as ICT usage increases. This is expected more so that cost of ICT usage constituted 94.68% of the cost of advertisement.

Despite the effectiveness of ICT usage by ABFIs, there are some problems and constraints to its usage. The following problems were identified as inhibiting factors to the expansion of ICT usage by the ABFIs:

a. Lack of basic infrastructure: The inadequacy and inefficiency of the information infrastructure have made majority to stay away form the proper usage of ICT in their business.

b. Non-conducive business environment: The unstable economy in the country stands as a great hindrance to ICT usage by ABFIs.

c. High cost of ICT devices: The increasing cost of ICT devices have made some ABFIs to stay away from using ICT for their businesses. Those that acquired the devices some years back are unable to give adequate maintenance.

CONCLUSION

The study revealed that ICT usage is an effective way of boosting food production and marketing by the ABFIs in southwest Nigeria. ICT usage was found to be a recent innovation among the ABFIs, but it has adequately increased the profit of the ABFIs in the study area. Higher profit can further be made if the problems facing the adoption and usage of ICT are given attention and properly taken care of by the relevant stakeholders.

RECOMMENDATIONS

An enabling environment that will empower stakeholders in the food and commerce industry is important especially in the present era of economic transformation. This should be in the area of appropriate policy formulation and implementation, capable of improving the underlying infrastructure, with a view to boosting food productivity and positively position the nation for global competition through the use of ICT. In addition, a review of the National Policy on ICT usage for better economic performance of the ABFIs towards achieving better performance in this area is essential.

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Table1: Costs and Returns Analysis of ICT Adoption by ABFIs in the study area

Parameters	Before	After
Mean revenue of ICT compliant establishments (₦' 000)	1,720,696.80	3,616,483.70
Total cost of marketing of ICT compliant establishments (₦' 000)	1,693,083.50	1,767,994.80
Profit (₦' 000)	27,613.30	1,848,488.90

Source: Field Survey, 2004

Table 2: Paired samples statistics of the marketing cost and revenue before and after ICT adoption per year

Parameters	Mean	N	Std. Deviation
Total cost of marketing before ICT adoption (₦' 000)	434627.91	34	1185253.3221
Total cost of marketing after ICT adoption (₦' 000)	2767994.8	34	2998868.7075
Mean revenue before ICT adoption (₦' 000)	1720696.8	66	2476817.6051
Mean revenue after ICT adoption (₦' 000)	3616483.7	66	5462050.2289

Paired samples test of the marketing cost and revenue before and after ICT adoption per year

Parameters	Mean	t-value	Sig. (2-tailed)
Total cost of marketing before ICT adoption (₦' 000) - Total cost of marketing after ICT adoption (₦' 000)	-2333367	-4.408	0.000
Mean revenue before ICT adoption (₦' 000) - Mean revenue after ICT adoption (₦' 000)	- 1895787	-4.801	0.000

Source: Field Survey, 2004.